MyDentist – A Proposed Interactive Patient Dental Clinical Information System with RFID based Patient Registration

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Abstract

This paper presents MyDentist, a proposed interactive Patient Dental Clinical Information System with RFID based patient registration to reduce the overall time for a dental patient visit. This system, MyDentist, was developed for the dental clinic in Universiti Teknikal Malaysia Melaka (UTeM). Requirements elicitation was done throughout a nine-month period and key staff including dentist and nurses in the dental clinic. The system was tested by clinic staff and results show that MyDentist reduced overall visit time per patient. The result of the implementation dramatically improves the performance of certain workflow process, particularly during the patient queue and doctor patient consultation.

Introduction

The use of clinical information systems helps coordinate the care of patients with diverse medical conditions. Appropriate medical care for patients require that physicians be able to communicate with one another about their patients. Furthermore, the poor coordination of care has been associated with poor clinical outcomes such as unnecessary hospitalization, duplicate tests, conflicting clinical advice, and adverse drug reactions[1]. The use of clinical information system enables clinicians treating people in a variety of settings to exchange and continuously update a patient's clinical data and then present that information in logical clinical groupings that other clinicians can access easily [2]. The basic benefits associated with clinical information systems include being able to easily access computerized records and the elimination of poor coordinated patient care.

However most the health care information system nowadays lack of many things such as; non-integrated clinical information, slow performance of system's response time, and threat on integrity of the electronic medical records [3]. Doctor-patient consultation plays a very important role in diagnosis of many clinical findings. Conventional ways of capturing clinical findings using paper's note, note book, manually entered digital records, and so on are still being used in the Malaysian healthcare system [4].

Universiti Teknikal Malaysia Melaka (UTeM) provides dental services at the UTeM Health Centre. Services provided include oral examination, dental scaling and polishing, tooth extraction, filling and oral health education and promotion. However, the challenge is to manage the patients' record manually and effectively to reduce patient waiting time. Registering patients manually will give some trouble to the registrar that handle the patients' record. This is because handling big data can cause some problems like data loss or data redundancy.

This research shall focus on the reduction of patient visit time during doctor patient consultation and patient registration.

Methodology

Requirements elicitation process took approximately nine months involving key staff personnel including dental doctor and dental assistants in UTeM Clinic. The main issues discussed revolved around three main questions:

- What is the process flow or current framework of the current manual system?

- What are the limitations and technical constraints of the current manual system or process?

- What are the major problems encountered that require the proposed system to solve?

Current Framework

The current framework or process flow of the dental clinic is as Figure 1. The current system or framework used by the dental unit is a manual system where the patient registers manually. This has many disadvantages which will affect the clinic's productivity. Common workflow issues associated with a manual or inefficient computerised system are inefficient documentation entry, patient waiting queue deficiencies, lack of integrated view of dental record, and unstandardised written prescription due to open ended manual system [5].
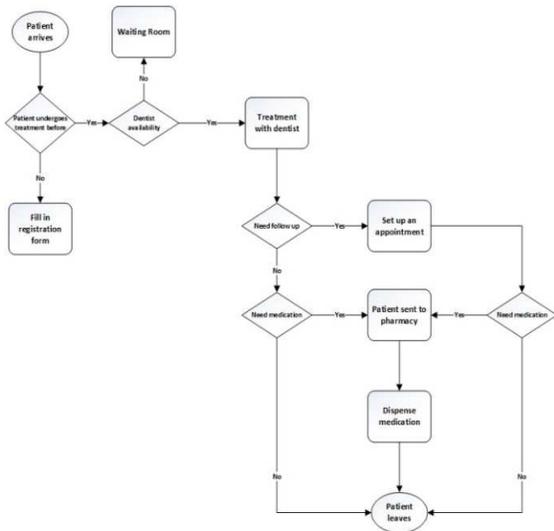
Figure 1: Flowchart of current system
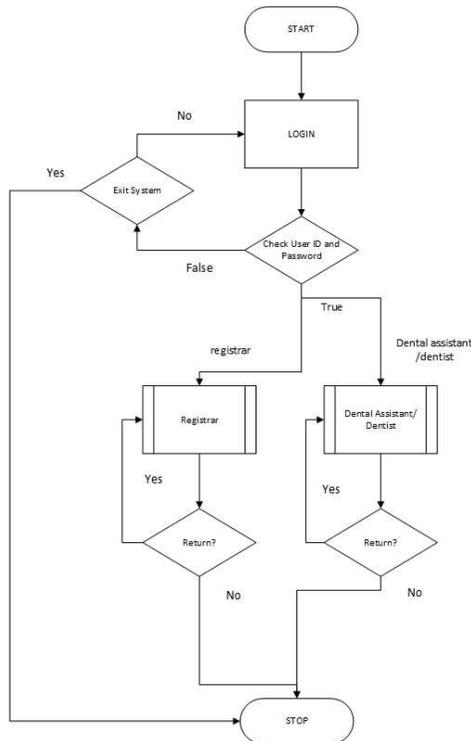
Proposed System - MyDentist

Figure 2: Proposed MyDentist

One of the major improvements done in the proposed system is the utilisation of an interactive interface for the selection and update of clinical dental records for the patient. The interactive interface will enable the doctor to graphically select related patient dental record and update with necessary treatment and history. The use of RFID in patient registration also shall speed up the dental process as patient waiting queue deficiency is noted as one of the processes that is time consuming.

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Results

The results from the implementation of the proposed system MyDentist are reduction of overall patient visit time for the specific process involving retrieval of patient treatment history

Process Improvement	Current System	MyDentist	Improve. (%)
Registration time	2 min	40.7 secs	66.1
Update of clinical records	2 min	45.6 secs	62
Read treatment history	3 min	54.6 secs	70.1

Table 1: Improvement of process time from the implementation of MyDentist

Table 1 shows the that MyDentist has successfully improved patient visit process in UTeM Dental Clinic.

Conclusion

In conclusion, MyDentist can easily manage patient data and improve process flow in UTeM Dental Clinic. Apart from that, this system has been successfully created according to the requirement stated in the planning phase. Future improvements that may be upgraded in MyDentist are patient queue time and automatic room assignment of patient.

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